

# High-Fidelity Modeling of Ablation and Coupled CFD-Material Response

Completed Technology Project (2011 - 2015)



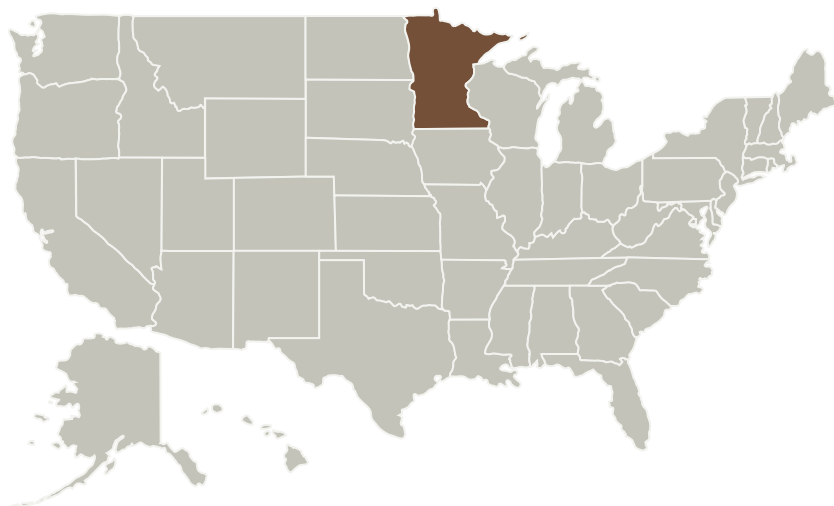
## Project Introduction

This research proposal seeks to improve the state of the art in the modeling and simulation of ablating thermal protection systems (TPS). It will accomplish the modeling goals by taking physics based approaches to the governing equations, and using sensitivity analysis to identify key processes and mechanisms for study. Additionally, it will work to couple all new capabilities developed to a well validated high fidelity computational fluid dynamics code (US3D). Finally, it will investigate the feasibility of performing fully coupled full trajectory simulations using capabilities developed in the research.. These goals are consistent with NASA's continued investment in improving aerothermal simulation tools, and are an essential part of creating the enabling technologies required for future exploration missions.

## Anticipated Benefits

This project seeks to improve the state of the art in the modeling and simulation of ablating thermal protection systems (TPS). The project goals are consistent with NASA's continued investment in improving aerothermal simulation tools, and are an essential part of creating the enabling technologies required for future exploration missions.

## Primary U.S. Work Locations and Key Partners



Project Image High-Fidelity Modeling of Ablation and Coupled CFD-Material Response

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## Organizational Responsibility

### Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

### Responsible Program:

Space Technology Research Grants

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Organizations Performing Work	Role	Type	Location
University of Minnesota-Twin Cities	Supporting Organization	Academia	Minneapolis, Minnesota

## Primary U.S. Work Locations

Minnesota

## Images

**4287-1363185505782.jpg**

Project Image High-Fidelity Modeling of Ablation and Coupled CFD-Material Response  
(<https://techport.nasa.gov/image/1773>)

## Project Website:

<https://www.nasa.gov/directorates/spacetech/home/index.html>

## Project Management

### Program Director:

Claudia M Meyer

### Program Manager:

Hung D Nguyen

### Principal Investigator:

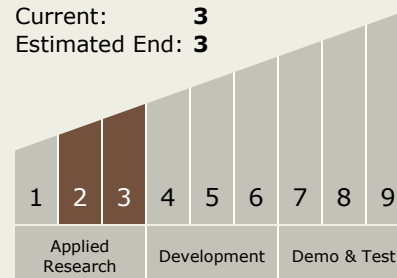
Graham V Candler

### Co-Investigator:

Eric C Stern

## Technology Maturity (TRL)

Start: 2  
Current: 3  
Estimated End: 3



## Technology Areas

### Primary:

- TX09 Entry, Descent, and Landing
  - TX09.4 Vehicle Systems
    - TX09.4.5 Modeling and Simulation for EDL